

THE GENUS *ODONTOMACHUS* IN THE SOUTHEASTERN UNITED STATES (HYMENOPTERA: FORMICIDAE)¹

Mark Deyrup², James Trager³, Norman Carlin⁴

ABSTRACT: The ants *Odontomachus brunneus*, *O. clarus*, and *O. ruginodis* are reported from Florida. *O. clarus* was not previously known from the eastern U.S., and probably represents a relic population confined to former islands in southern Florida. *O. ruginodis* is removed from synonymy with *O. brunneus*. *O. brunneus* is sympatric with *O. clarus* and *O. ruginodis*. The species can be distinguished by morphological differences in workers and males. Large flights of *O. clarus* occur from July to November during several nights around the full moon.

Species of the genus *Odontomachus* are among the most distinctive of southeastern ants. They are large ants, about 8 mm long, with porrect mandibles and converging dorsal furrows on the head (Fig. 1). The workers are able to convulsively snap their mandibles, thus dismembering arthropods. If the mandibles strike a solid object they may fling the ant into the air. Southeastern *Odontomachus* are probably exclusively predatory. The workers can both bite and sting, but are shy and unaggressive toward humans, even when the nest is disturbed.

The purpose of this paper is to confirm the presence of three species of *Odontomachus* in the southeastern United States and to provide a few details on the ecology of one of these.

Creighton (1950), in his manual on ants, included a single southeastern species, *O. haematodus insularis* Guérin, from Florida, southern Georgia, and Cuba, and stated that it also was distributed by commerce through many parts of the tropics. Brown (1976) revised *Odontomachus* and stated that the southeastern species, called *insularis*, *haematodus insularis*, *ruginodis*, and *haematodus ruginodus* by various workers, was a northern population of a widespread Neotropical species. He called this species *brunneus* (Patton), placed *ruginodis* Wheeler in synonymy with *brunneus*, and separated it from *haematodus* (L.) and *insularis*, both distinct Neotropical species. According to Brown (1976) *insularis* is confined to

¹Received November 29, 1984. Accepted June 3, 1985.

²Archbold Biological Station, P.O. Box 2057, Lake Placid, FL 33852.

³Archer Road Entomology Lab., University of Florida, Gainesville, FL 32611.

⁴Museum of Comparative Zoology, Harvard Univ., Cambridge, MA 02138

the West Indies, *haematodus* is widespread in South America east of the Andes, while *brunneus* occurs from the southeastern United States to Paraguay and Bolivia, including the West Indies. These nomenclatural changes were published too late to be included in the Catalog of Hymenoptera in America north of Mexico (Smith, 1979), which lists a single eastern species, *insularis*, found in Georgia, Florida, Alabama, Mexico to Brazil, West Indies, Cocos Island, and Clipperton Island.

In the course of studying the ants of the Archbold Biological Station (Highlands Co., Florida) we found two species of *Odontomachus* living in the area, *O. brunneus* (Patton) and *O. clarus* Roger. A third species was found at the southern tip of the Florida Peninsula and in the Florida Keys. This species has workers superficially similar to those of *O. clarus*, but has highly distinctive males. This species appears to be *O. ruginodis* Wheeler, a form which was synonymized (Brown, 1976) with *O. brunneus* at a time when only workers were available and there were no known sympatric populations of *ruginodis* and *brunneus*. *O. ruginodis* was described by Wheeler as a variety of a subspecies, *O. haematodus insularis* var. *ruginodis*, and was referred to as *O. ruginodis* by Wilson in 1964. The identifications of the three species for this paper were kindly provided by Dr. William L. Brown, Jr., of Cornell University.

The precise geographic distribution of the three species remains unclear. *O. ruginodis* is known from extreme southern Florida and from the West Indies, where Wheeler's specimens originated (Brown, 1976). *O. ruginodis* is not known from the Archbold Biological Station and was not found by Van Pelt in his intensive surveys (1958) of the Welaka and Gainesville areas. It is probable that *O. ruginodis* is a relatively recent West Indian immigrant or introduction. We have examined specimens from Martin Co. (Jonathan Dickinson St. Pk.), Broward Co. (Davie), Monroe Co. (Flamingo, Key Largo, Saddlebunch Key), and Collier Co. (Monroe Station). The distribution of *O. brunneus* in the Neotropics is presently unclear, but it is widespread in Florida. It is the only species known from northern Florida. We have examined specimens from Martin Co. (Jonathan Dickinson St. Pk.), Broward Co. (Davie), Highlands Co. (Archbold Biological Station), Alachua Co. (Gainesville), Marion Co. (Juniper Springs), and Leon Co. (Tall Timbers Research Station). *O. clarus* occurs in xeric areas of Mexico and the southwestern U.S. (Brown, 1976). In Florida it is known only from xeric upland habitats of the Archbold Biological Station. This species was not found in Van Pelt's exhaustive survey (1958) of ants of Welaka scrub habitats, and may well be isolated on one or more small areas of scrub in subtropical Florida. A number of Florida orthopterans (Hubbell, 1965) and beetles (Woodruff, 1973)

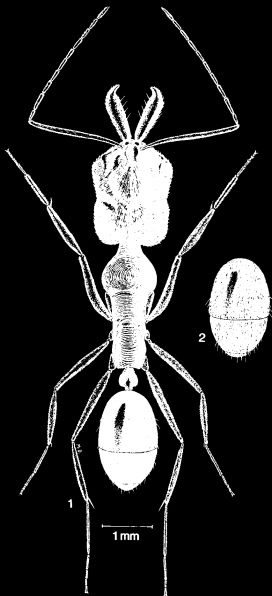


Figure 1. Dorsal view of *Odontomachus clarus*

Figure 2. Dorsal view of gaster of *Odontomachus brunneus*

appear to be derived from Western or Central American species that were stranded on islands in central Florida during periodic inundations of the Peninsula, and remain restricted to habitats found on the deep well-drained sand of these relic islands. *O. clarus* seems to fit this pattern, as do certain other ants inhabiting the Florida scrub.

The three species of southeastern *Odontomachus* may be recognized by the following characters:

O. brunneus. Worker: gaster densely covered with fine, almost contiguous appressed hairs (fig. 2); striations of pronotum not transverse posteriorly; petiolar node faintly rugose at extreme base only; inner side of hind femur at base finely pubescent; color piceous in n. Florida, body (except gaster) frequently lighter in s. Florida. Male: each ocellus as wide as the ocello-ocular space, ocelli on a conspicuous turret (fig. 5); petiole smooth; head and body entirely yellowish orange.

O. clarus. Worker: gaster sparsely covered with fine appressed hairs, separated by at least 1/4 their length (fig. 1); striations of pronotum transverse posteriorly; petiolar node slightly rugose basally on sides, smooth in back; inner side of hind femur at base virtually glabrous; color

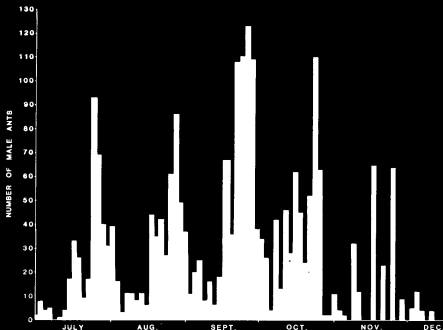


Figure 3. Male *O. clarus* captured in Malaise traps, 1983, Archbold Biological Station. Collections made on alternate days.

reddish brown, gaster black. Specimens examined from two sites in Chihuahua and two sites in Texas differ from Florida specimens in having much larger dorsal punctures along the inner edge of the mandible, and the petiolar spine relatively short and blunt. Male (Florida): each ocellus wider than the ocello-ocular space, ocelli on a conspicuous turret (fig. 6); petiole smooth; head and body entirely brown.

O. ruginodis. Worker: gastral hairs, pronotal striation, inner side of hind femur approximately as in *O. clarus*; petiole conspicuously transversely striate on sides and back; color reddish brown to piceous gaster black. Male: each ocellus less than two-thirds as wide as ocello-ocular space, ocelli not on a turret (fig. 7); petiole strongly rugose laterally; propodeum

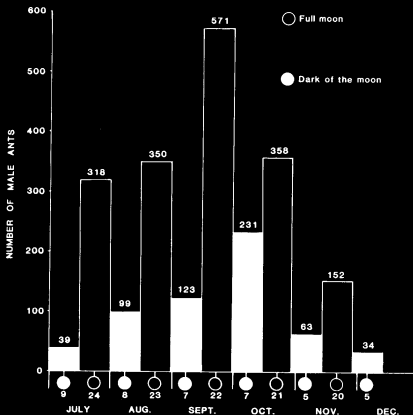


Figure 4. Male *O. clarus* captured during fortnights centered on the full moon and fortnights centered on the dark of the moon.



Figures 5 and 6. Frontal views of head of male: 5. *O. brunneus* (top), 6. *O. clarus* (bottom).

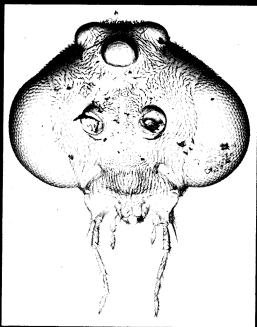


Figure 7. Frontal view of head of male. *O. ruginodis*.

and lateral pronotal spot black, remainder of thorax and head yellow, gaster brown.

Specimens of workers and males of all species have been deposited in the collection of the Archbold Biological Station and in the Florida State Collection of Arthropods, Gainesville.

At the Archbold Biological Station the two species seem to show a difference in habitat preference. *O. clarus* usually occurs in well-drained sites such as sandhill and sand pine scrub (16 collections). *O. brunneus* usually occurs in wet areas such as hammock and ditches (23 collections).

In addition to habitat differences and some distributional differences, there is probably a temporal separation in male flights of *clarus* and *brunneus*. Males of *brunneus* fly in spring, those of *clarus* in summer and fall. This is documented by a rather small series of *brunneus* taken at lights and a very large series of *clarus* taken in Malaise traps in sand pine scrub. *O. brunneus* males were collected in May and June of 1983 and 1984 and December of 1983. Fig. 3 shows seasonal flight data of *O. clarus*.

Flights of *O. clarus* are not correlated with fluctuations in temperature or rainfall. Monthly peaks in numbers of captured males seem to be associated

with the full moon (Fig. 4). Various groups of nocturnal insects have flights synchronized by the full moon (Johnson, 1969), but we have found no reports of lunar cycles affecting flights of ants. Most species of night-flying ants at the Archbold Biological Station seem to fly during or just after rain on warm nights. The flight pattern of *O. clarus* suggests that production of adult males occurs over a period of several months. This long flight period might be attributed to the relatively equable climate of south Florida, which does not impose strong seasonal restraints on phenology. The long flight period might also be construed as a primitive condition, as opposed to the condition in which large numbers of alates are reared synchronously and restrained in the nest until there is the proper alignment of environmental cues.

ACKNOWLEDGMENTS

This work would not have been possible without the help of Dr. William Brown Jr. (Cornell) who identified the three species. The work of James Trager at the Archbold Biological Station was supported in part by a grant from Archbold Expeditions, Inc. Nancy Deyrup prepared figures 3 and 4. Edward Seling, Harvard Univ., prepared the photographs. Helpful suggestions were provided by anonymous reviewers. Todd Coleman, Richard Shepard, and Edward Fabian assisted in tabulation of flight data.

LITERATURE CITED

- Brown, W.L. 1976. Contributions toward a reclassification of the Formicidae. Part VI. Ponerinae, tribe Ponerini, subtribe Odontomachini. Section A. Introduction, subtribal characters. Genus *Odontomachus*. Studia Entomol. 19: 67-171.
- Creighton, W.S. 1950. The ants of North America. Bull. Harvard Mus. Comp. Zool. 104: 1-583.
- Hubbell, T.H. 1961. Endemism and speciation in relation to Pleistocene changes in Florida and the southeastern coastal plain. Eleventh Int. Congr. Entomol., Wien. 1960, 1: 466-469.
- Johnson, C.G. 1969. Migration and dispersal of insects by flight. Methuen and Co., London. xxii + 763 pp.
- Smith, D.R. 1979. Family Formicidae. Pp. 1312-1467, in K.V. Krombein, P.D. Hurd, Jr., D.R. Smith, and B.D. Burks (eds.), Catalog of Hymenoptera in America north of Mexico. Vol. 2, pp. i-xvi, 1199-2209.
- Van Pelt, A.F. 1958. The ecology of the ants of the Welaka Reserve, Florida (hymenoptera: Formicidae). Part II. Annotated list. Amer. Midl. Natur. 59: 1-57.
- Wilson, E.O. 1964. The ants of the Florida Keys. Breviora 210: 1-14.
- Woodruff, R.C. 1973. Arthropods of Florida and neighboring land areas. The scarab beetles of Florida. Gainesville, Fla. Dept. Agric. Consum. Serv. Div. Plant Indust. iv + 220 pp.